

110TH CONGRESS  
1ST SESSION

# S. 1807

To establish the Weather Mitigation Advisory and Research Board, and for other purposes.

---

IN THE SENATE OF THE UNITED STATES

JULY 17, 2007

Mrs. HUTCHISON introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

---

## A BILL

To establish the Weather Mitigation Advisory and Research Board, and for other purposes.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*

3       **SECTION 1. SHORT TITLE.**

4       This Act may be cited as the “Weather Mitigation  
5       Research and Development Policy Authorization Act of  
6       2007”.

7       **SEC. 2. PURPOSE.**

8       It is the purpose of this Act to develop and implement  
9       a comprehensive and coordinated national weather mitiga-

1 tion policy and a national cooperative Federal and State  
2 program of weather mitigation research and development.

3 **SEC. 3. FINDINGS.**

4 Congress finds the following:

5 (1) According to a 2003 report by the National  
6 Research Council, “people in drought- and hail-  
7 prone areas willingly spend significant resources on  
8 weather mitigation programs, and in 2001 there  
9 were at least 66 operational programs being con-  
10 ducted in 10 States across the United States. At the  
11 same time, less than a handful of weather mitigation  
12 research programs are underway worldwide, and re-  
13 lated research in the United States has dropped to  
14 less than \$500,000 per year from a high of  
15 \$20,000,000 in the late 1970s.” The NRC report  
16 entitled “Critical Issues in Weather Modification Re-  
17 search” also states that “a coordinated national pro-  
18 gram of weather modification research is needed”.  
19 Such a program is supported by States that need a  
20 scientific means of evaluating current programs and  
21 increasing their effectiveness through applied re-  
22 search.

23 (2) Droughts in the United States result in an  
24 average economic loss between \$6,000,000,000 and  
25 \$8,000,000,000 annually, while severe hail pro-

1       ducing storms result in up to \$2,300,000,000 dam-  
2       age to crops and over \$2,000,000,000 in property  
3       loss annually. Snowpack, rain enhancement, and hail  
4       suppression weather mitigation projects help reduce  
5       these losses, and additional research in these areas  
6       will make existing programs even more effective and  
7       permit them to better quantify their impacts. Recent  
8       droughts in the Western United States have pro-  
9       duced low lake levels at Lake Powell and Lake Mead  
10      and have led the Seven Colorado River Basin States  
11      to create cooperative agreements. A separate cooper-  
12      ative agreement is in place for wintertime snowfall  
13      enhancement programs in the States of Utah, Colo-  
14      rado, and Wyoming to pursue water augmentation  
15      to benefit the entire Colorado River System.

16           (3) Past and recent evaluations of the potential  
17      for snowpack augmentation by cloud seeding in the  
18      Colorado River Basin indicate a significant yield in  
19      runoff can be attained through properly designed  
20      projects. A 2006 evaluation by the Bureau of Rec-  
21      lamation of the Department of the Interior indicates  
22      the potential for 800,000 additional acre-feet of  
23      water.

24           (4) The impacts of possible climate change and  
25      the human impact on weather are not well under-

stood. Weather mitigation research could provide data on what, if any, impact pollution may have on the precipitation processes in cloud systems. Research into inadvertent and planned weather mitigation may increase our understanding and knowledge of any potential impacts.

(5) The recent Weather Damage Modification Program conducted by the Bureau of Reclamation employed a successful model for combining local, State, and Federal resources in providing a means for scientific evaluation of operational cloud-seeding projects (rainfall and snowfall enhancement and hail suppression) in North Dakota, Oklahoma, Texas, Colorado, Utah, Nevada, and California.

**SEC. 4. DEFINITIONS.**

In this Act:

(1) BOARD.—The term “Board” means the Weather Mitigation Advisory and Research Board established under section 5(a).

(2) EXECUTIVE DIRECTOR.—The term “Executive Director” means the Executive Director of the Board appointed under section 5(d).

(3) RESEARCH AND DEVELOPMENT.—The term “research and development” means theoretical analysis, exploration, experimentation, and the extension

1 of investigative findings and theories of a scientific  
 2 or technical nature into practical application for ex-  
 3 perimental and demonstration purposes, including  
 4 the experimental production and testing of models,  
 5 devices, equipment, materials, and processes.

6 **SEC. 5. WEATHER MITIGATION ADVISORY AND RESEARCH**  
 7 **BOARD ESTABLISHED.**

8 (a) ESTABLISHMENT.—There is established in the  
 9 National Science Foundation the Weather Mitigation Ad-  
 10 visory and Research Board to establish and coordinate the  
 11 national research and development program on weather  
 12 mitigation described in section 6.

13 (b) MEMBERSHIP.—

14 (1) COMPOSITION.—The Board shall consist of  
 15 11 members appointed by the Director of the Na-  
 16 tional Science Foundation as follows:

17 (A) At least 2 members shall be represent-  
 18 atives of States that are currently supporting  
 19 operational weather mitigation programs.

20 (B) At least 2 members shall be a rep-  
 21 resentative of the National Center for Atmos-  
 22 pheric Research of the National Science Foun-  
 23 dation.

1           (C) At least 1 member shall be a rep-  
2           resentative of National Aeronautics and Space  
3           Administration.

4           (D) At least 1 member shall be a rep-  
5           resentative of the American Meteorological So-  
6           ciety.

7           (E) At least 1 member shall be a rep-  
8           resentative of the American Society of Civil En-  
9           gineers.

10          (F) At least 1 member shall be a rep-  
11          resentative of the National Academy of  
12          Sciences.

13          (G) At least 1 member shall be a rep-  
14          resentative of the National Oceanic and Atmos-  
15          pheric Administration of the Department of  
16          Commerce.

17          (H) At least 1 member shall be a rep-  
18          resentative of the Department of Agriculture.

19          (I) At least 1 member shall be a represent-  
20          ative of institutions of higher education or re-  
21          search institutes with experience in the field.

22          (2) TENURE.—A member of the Board shall  
23          serve at the pleasure of the Director of the National  
24          Science Foundation.

1           (3) VACANCIES.—Any vacancy on the Board  
2           shall be filled in the same manner as the original ap-  
3           pointment.

4           (c) CHAIR AND VICE CHAIR.—The Board shall select  
5           a Chair and Vice Chair from among its members.

6           (d) STAFF.—The Chair of the Board may appoint  
7           and terminate an executive director and such other addi-  
8           tional personnel as may be necessary to enable the Board  
9           to perform its duties. The employment of an executive di-  
10          rector shall be subject to confirmation by the Board.

11          (e) ADVISORY COMMITTEES.—The Board may estab-  
12          lish advisory committees to advise the Board and to make  
13          recommendations to the Board concerning legislation, poli-  
14          cies, administration, research, and other matters.

15          (f) INITIAL MEETING.—Not later than 30 days after  
16          the date on which all members of the Board have been  
17          appointed, the Board shall hold its first meeting.

18          (g) MEETINGS.—The Board shall meet at the call of  
19          the Chair.

20          (h) QUORUM.—A majority of the members of the  
21          Board shall constitute a quorum, but a lesser number of  
22          members may hold hearings.

23          (i) POWERS OF THE BOARD.—

24                (1) STUDIES, INVESTIGATIONS, AND HEAR-  
25          INGS.—The Board may conduct studies, obtain in-

1       formation, and hold hearings necessary to carry out  
2       the purposes of this Act.

3               (2) COOPERATION WITH OTHER AGENCIES.—

4       The Board may cooperate with public or private  
5       agencies to promote the purposes of this Act.

6               (3) COOPERATIVE AGREEMENTS.—The Board

7       may enter into cooperative agreements with the head  
8       of any department or agency of the United States,  
9       an appropriate official of any State or political sub-  
10      division of a State, or an appropriate official of any  
11      private or public agency or organization to conduct  
12      research and development pertaining to weather  
13      mitigation.

14              (4) CONDUCTING AND CONTRACTING FOR RE-

15      SEARCH AND DEVELOPMENT.—The Executive Direc-  
16      tor, with the approval of the Board, may conduct or  
17      contract for research and development activities in  
18      accordance with section 6.

19   **SEC. 6. NATIONAL RESEARCH AND DEVELOPMENT PRO-**  
20                   **GRAM ON WEATHER MITIGATION.**

21              (a) IMPLEMENTATION PLAN.—Not later than 180  
22      days after the date of the enactment of this Act, the Exec-  
23      utive Director shall develop and submit to Congress a plan  
24      for the establishment and coordination of the national re-



1 search and development program required by section 5(a).

2 Such plan shall—

3 (1) for the 10-year period beginning in the year  
4 it is submitted, establish the goals and priorities for  
5 Federal research that most effectively advance sci-  
6 entific understanding of weather mitigation;

7 (2) describe specific activities required to  
8 achieve such goals and priorities, including funding  
9 of competitive research grants, training and support  
10 for scientists, and participation in international re-  
11 search efforts;

12 (3) identify and address, as appropriate, rel-  
13 evant programs and activities of the Federal agen-  
14 cies and departments that would contribute to the  
15 program;

16 (4) consider and use, as appropriate, reports  
17 and studies conducted by Federal agencies and de-  
18 partments, weather modification organizations, and  
19 other expert scientific bodies, including the National  
20 Research Council report entitled “Critical Issues in  
21 Weather Modification Research”;

22 (5) make recommendations for the coordination  
23 of program activities with weather mitigation activi-  
24 ties of other national and international organiza-  
25 tions; and

1           (6) estimate Federal funding for research ac-  
2           tivities to be conducted under the program.

3           (b) PROGRAM ACTIVITIES.—The national research  
4           and development program required by section 5(a) may  
5           include the following activities related to weather mitiga-  
6           tion:

7           (1) Interdisciplinary research and development  
8           and coordination of research and development and  
9           activities to improve understanding of processes re-  
10          lating to planned and inadvertent weather mitiga-  
11          tion, including the following:

12                   (A) Research related to cloud and precipi-  
13                   tation physics.

14                   (B) Cloud dynamics and cloud modeling.

15                   (C) Improving cloud seeding-related tech-  
16                   nologies.

17                   (D) Severe weather and storm research.

18                   (E) Research related to potential adverse  
19                   affects of weather mitigation.

20          (2) Coordination with relevant organizations  
21          that engage in weather mitigation research.

22          (3) Development through partnerships among  
23          Federal agencies, State agencies with weather modi-  
24          fication experience, and academic institutions of new  
25          technologies and approaches for weather mitigation.

1           (4) Establishing scholarships and educational  
2           opportunities that encourage an interdisciplinary ap-  
3           proach to weather mitigation.

4           (5) Promotional activities in accordance with  
5           subsection (c).

6           (6) Administering the grant program described  
7           in subsection (d).

8           (c) PROMOTION OF RESEARCH AND DEVELOP-  
9           MENT.—In order to assist in expanding the theoretical  
10          and practical knowledge of weather mitigation, the Board  
11          shall promote and fund research and development, studies,  
12          and investigations with respect to—

13           (1) improved forecast and decision-making tech-  
14           nologies for weather mitigation operations, including  
15           tailored computer workstations and software and  
16           new observation systems with remote sensors; and

17           (2) assessments and evaluations of the efficacy  
18           of weather mitigation.

19          (d) GRANT PROGRAM FOR RESEARCH AND DEVELOP-  
20          MENT.—

21           (1) IN GENERAL.—The Board may establish a  
22           grant program for the award of grants to eligible en-  
23           tities for research and development projects that  
24           pertain to weather mitigation. To the extent prac-  
25           ticable, the grant program shall be modeled after

1 both the Atmospheric Modification Program imple-  
2 mented by the National Oceanic and Atmospheric  
3 Administration in 1980, and the Weather Damage  
4 Modification Program implemented by the Bureau of  
5 Reclamation of the Department of the Interior in  
6 2002.

7 (2) AMOUNT.—The Board may not award a  
8 grant under this subsection in an amount that—

9 (A) is greater than \$500,000; or

10 (B) is less than \$50,000.

11 (3) FEDERAL SHARE.—The Board may not  
12 award a grant under this subsection for a project if  
13 the Federal share of such project would be greater  
14 than 50 percent of the project cost, which may in-  
15 clude in-kind services furnished by the participating  
16 State.

17 (4) ELIGIBLE ENTITIES.—For purposes of this  
18 subsection, an eligible entity is a State agency, insti-  
19 tution of higher education, or nonprofit organization  
20 that has—

21 (A) an established background and exper-  
22 tise in the field of weather mitigation; and

23 (B) experience with working with and co-  
24 ordinating with State agencies.

1           (5) USE OF FUNDS.—A recipient of a grant  
2           under this subsection may only use the grant for a  
3           research and development project that—

4                   (A) pertains to weather mitigation; and

5                   (B) was in operation on the day before the  
6           date the grant was awarded.

7   **SEC. 7. ANNUAL REPORT ON ACTIVITIES.**

8           (a) IN GENERAL.—Not later than January 31, and  
9           annually thereafter, the Executive Director shall prepare  
10          and submit to the President and Congress an annual re-  
11          port on the activities conducted pursuant to this Act dur-  
12          ing the preceding calendar year, including the following:

13                  (1) A summary of the achievements of Federal  
14          weather mitigation research, including Federally  
15          supported external research, during the preceding  
16          fiscal year.

17                  (2) An analysis of the progress made toward  
18          achieving the goals and objectives of the plan devel-  
19          oped under section 6(a), including the identification  
20          of trends.

21                  (3) A copy or summary of the plan required by  
22          section 6(a) and any changes made to the plan.

23                  (4) A summary of agency budgets for weather  
24          mitigation activities for the preceding fiscal year.

1           (5) Recommendations, if any, regarding addi-  
2           tional action or legislation that may be required to  
3           assist in achieving the purposes of this Act.

4           (6) A description of the relationship between re-  
5           search conducted on weather mitigation and re-  
6           search conducted pursuant to the Global Change Re-  
7           search Act of 1990 (15 U.S.C. 2921 et seq.), as well  
8           as research on weather forecasting and prediction.

9           (7) A description of any potential adverse con-  
10          sequences on life, property, or water resource avail-  
11          ability from weather mitigation efforts, and any sug-  
12          gested means of mitigating or reducing such con-  
13          sequences if such efforts are undertaken.

14          (b) FIRST REPORT.—The first report required by  
15          subsection (a) shall be submitted on January 31 in the  
16          second calendar year following the date of the enactment  
17          of this Act.

18       **SEC. 8. COOPERATION WITH WEATHER MITIGATION ADVI-**  
19                               **SORY AND RESEARCH BOARD.**

20          The head of any department or agency of the United  
21          States and the head of any other public or private agency  
22          or institution that receives research funds from the United  
23          States shall, to the extent practicable, cooperate with the  
24          Board for purposes of carrying out this Act.

1 **SEC. 9. FUNDING.**

2       (a) AUTHORIZATION OF APPROPRIATIONS.—There  
3 are authorized to be appropriated to the Board for the  
4 purposes of carrying out this Act \$10,000,000 for each  
5 of the fiscal years 2008 through 2017. Amounts appro-  
6 priated pursuant to this subsection shall remain available  
7 until expended.

8       (b) GIFTS.—The Board may accept, use, and dispose  
9 of gifts or donations of services or property.

○